automation rigs extravaganza for success
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One of the most spectacular stunts ever achieved at a live music event in South Africa involved flying a replica helicopter across the stage at the Afrikaans is Groot festival at the Sun Arena in Menlyn, Pretoria. This was achieved using state-of-the-art automation and mechatronics technology from SEW-Eurodrive. Read our cover story on page 11 to find out how rigging company Film Riggers pulled this off by taking advantage of the latest developments from SEW-Eurodrive in automation and mechatronics.
A new world

The soft side of IoT

At the start of a new year it’s fun to have a look at what’s in store for us technology-wise, and Gartner Group generally has something to say. Its latest report on Top Strategic IoT Trends and Technologies Through 2023 identifies the ten technology trends that are expected to have the most impact worldwide. These are artificial intelligence; social, legal and ethical IoT; infonomics and data broking (the buying and selling of IoT data); the shift to intelligent edge and intelligent mesh (from centralised and cloud to more complex edge architectures); IoT governance; sensor innovation; trusted hardware and operating systems (security is a huge technical concern in IoT systems); new user experiences; innovation on the chip; and new wireless networking technologies.

Some of these are already well on their way – artificial intelligence, wireless networking, edge computing – but Gartner says that the softer trends are also affecting IoT’s future. Human concerns such as social, legal and ethical IoT and IoT governance are equally important, as is user experience. Some of the issues to be faced are ownership of data and the conclusions that are drawn, privacy and compliance with regulations. Governance frameworks also need to be drawn up to draft rules about the creation, storage, use and deletion of information in order to manage people’s behaviour.

Gartner also says that user experience is a critical trend. IoT is radically changing the way people and companies interact with technology, and IoT solutions need to be socially acceptable as well as technically effective. User experience design is becoming a key element of competitive advantage. Before, all that was needed was a web design. Now you also need innovation in product development, customer strategy and business transformation. Human/IoT interactions are increasingly without screens and keyboards, and user experience designers must use new technologies and adopt new ideas to create interfaces that reduce friction, lock in users and encourage their use and retention. All this will be driven by four building blocks: new sensors, new algorithms, new experience architectures, and socially aware experiences. The conventions are still being drafted. How they develop will determine the future of IoT.

Unlocking the value of digital transformation

Closer to home, another recent research report, this one by Accenture together with the World Economic Forum, says that digital technologies could unlock over R5 trillion in value in South Africa by 2026. In recent issues of Motion Control we have covered how South Africa is responding to 4IR through the impressive Intsimbi Future Production Technologies Initiative. This drive is aimed at changing the face of automation in South Africa in a partnership between government and industry. The Accenture report is right in line with this programme.

Unlocking Digital Value for Business and Society in South Africa finds that by implementing digital technologies in government services and key industry sectors, value to society and industry amounting to R2 trillion and R3.6 trillion respectively could be unlocked in the next decade. Drawing on expert interviews, local statistics and industry reports, the research measures the impact digital technologies such as analytics, blockchain, virtual reality and artificial intelligence could have on the environment, consumers, labour and government.

What the research does is to highlight major areas in which South Africa can unlock value. It is also intended to lay down groundwork, stimulate dialogue, encourage public-private sector collaboration, and offer recommendations for national digital transformation strategies and investments that can lead to economic growth.

Accenture says the three core digital technologies and enablers that have the greatest potential for value creation are IoT and connected devices, artificial intelligence and platforms. The potential value of IoT will be the highest as a result of the combined effect of greater affordability of smart devices together with their widespread adoption.

Digitalisation in agriculture, manufacturing and financial services has the highest potential for growth. In the agricultural sector, for example, the combined use of autonomous vehicles, drones and sensors can make precision agriculture possible, improving the use of resources and increasing yields. In the manufacturing sector there is the opportunity to improve response time, and introduce added value services, sector there is the opportunity to improve response time, and introduce added value services, and Accenture says that digitalisation of public infrastructure maintenance, public administration and healthcare alone could add over R1.2 trillion to society over the next decade through its impact on economic activity, productivity and service delivery.

However, the report warns that progress will require effort and investment in connectivity, as well as public-private partnerships. Skills development will also be critical. Let’s see what happens, for now I think I will look at this as a glass half full.
Driving force for the future

Association Objectives

- Raise the professional standards of the pneumatics and hydraulic industries
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- To promote, collect, collate, distribute data, ideas and knowledge
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SAFPA membership certificate may be used to support tender applications, members are also welcome to use the SAFPA logo on all their advertising.
From the President’s desk

2019 is here! I hope you had a relaxing and safe festive break and are in the thick of things like me, it seems like the holidays were too short and far too long ago. I trust 2019 will be a prosperous year for the industry, bringing on more challenges and with it, more opportunities.

SAFPA has been relatively quiet over the past quarter in terms of technical evenings at the Italian club and showcasing new products within the industry. It seems as if everyone has been extremely busy and focused on the job at hand up to the end of the year. I would like to encourage SAFPA members and OEMs to please get in touch with the SAFPA committee if there is a guest speaker in the country introducing new technology or showcasing relevant products that may be beneficial to attendees.

There has been a significant amount of requests for an updated market survey to be conducted. The previous survey was concluded in 2012 and with the significant amount of acquisitions, rebranding and OEM entries into the local market sector, there is a definite need to conduct an updated market survey.

SAFPA is in the fortunate position that we can make use of the same independent services of DB Janse van Rensburg. He formerly ran the Centre for Marketing Research at Tshwane University of Technology. He now works independently, as a consultant in market research. Total impartiality and confidentiality are guaranteed.

It is the intention of SAFPA to approach all importers of fluid power equipment (hydraulic, pneumatic, hose/fittings, and steel tube/fittings) and ask for their participation in this important exercise. SAFPA will not be approached the resellers or the secondary market, thereby cutting out the compounding of sales figures. Sales data for the 12 months ending December 2018 will be utilised in the compiling of the survey.

Once the survey is complete, it will be made available, free of charge to all participants. Any other parties will be asked to pay a fee for a copy of the survey.

The survey will serve as a reference to the size of the fluid power market in South Africa, therefore giving more sway when dealing with the DTI and trade incentives for exporting of manufactured goods.

A technical evening will be arranged where the guest speaker will give an overview of his processes and how the survey will be conducted together with interpolation of the results. We encourage SAFPA members to attend the evening and allay any fears or concerns with regards to confidentiality. You should receive communication from SAFPA soon to confirm the dates and times.

Beyond the survey, the formation of a sub-committee for pressure vessel regulations will be actioned by the end of March. Many queries relating to SANS 347, PER and OHSACT have been received by SAFPA. A committee will therefore present a PER guide with regards to hydraulic accumulators within the industry inline with regulations and best practice guidelines. Once the guidelines are complete and a consensus reached within the sub-committee, they will be available to SAFPA members.

All the best for 2019, I hope it will be a prosperous one.

Regarding
Dustin Pereira

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Join us on one or more of the upcoming events and network with your industry whilst having some fun.

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New efforts bring hope for Industry 4.0-ready SA workforce

Industry 4.0 – smart new automation tools and technologies – are rapidly changing the face of manufacturing and industry around the world. Without a concerted effort to change industry processes and infrastructure, and upskill the workforce, South Africa risks falling behind the world in its efforts to become a player in the global manufacturing market. However, new industry initiatives are emerging to address the skills shortfall and help propel South Africa into a smarter era of manufacturing.

Speaking ahead of Africa Automation Fair 2019, automation industry stakeholders said aligning with the global Industry 4.0 revolution would demand a great deal of change and progress in South Africa. A key priority had to be skills, they say.

Dave Wibberley, managing director at Adroit Technologies, notes that Industry 4.0 in itself is not a ‘silver bullet’ that will change manufacturing. “Industry 4.0 refers to a set of tools and services. To be effective, these tools and services depend on the necessary resources and knowledge being in place in processes. You need to achieve world-class manufacturing and tooling first,” he says.

Frikkie Streicher, business development manager at process instrumentation manufacturer Vega, says a greater effort is needed to develop the automation engineering skills pipeline, to allow South African industry to prepare for Industry 4.0: “Automation engineering is not yet recognised as a separate field in South Africa. We need to step up our focus on automation engineering if South Africa is to achieve its ambitions of becoming a manufacturing giant in Africa.”

Annemarie van Coller, president of the Society for Automation, Instrumentation, Measurement and Control (SAIMC), says that while automation presents massive economic growth opportunities, it does threaten the current environment’s workforce structure: “If you look at the current ‘triangle of training,’ we have a small number of engineers at the apex, and a large number of artisans at the bottom. We need to invert this triangle and produce a far greater number of engineers capable of supporting automation in future.”

Efforts are now underway to fast-track this process, developing new curricula for automation engineers and introducing new learning models to upskill employees. SAIMC and other industry stakeholders are moving to introduce a skills development model for the automation sector, based on the successful model introduced in the tooling sector. Driven by Johan Maartens, SAIMC director & COO, the initiative will see the launch of an education and training system for Automation personnel modelled on the National Tooling Initiative Programme (NTIP) for the tool and die industry. The launch of the new programme includes the renaming and rebranding of the tooling programme as the National Technologies Implementation Platform (NTIP) under the oversight of the Intsimbi Board. The programme is intended to serve as a fully-fledged Fourth Industrial Revolution programme, including training in robotics, mechatronics and industrial maintenance, and involving over 500 companies.

Launching the new Intsimbi Future Production Technologies Initiative (IFPTI) at NTIP’s Centre of Excellence in Cape Town earlier this year, Trade and Industry Minister Rob Davies said the government was committed to building capacity in response to the impact and opportunities that Industry 4.0 will bring about.

While funding models and curriculum development are still under discussion, van Coller is optimistic that the new initiative will drive the change the sector needs.

“We’re very excited about this, and its potential. It will bring new opportunities for upskilling – gone are the days of being too old or living too far from a university. This model allows for free, flexible, home-based learning using online tools, along with some facilitator-led learning. Stakeholders are also looking at the necessary infrastructures for participants in rural areas with limited Internet access. It presents the hope that we can develop our own advanced automation skills pipeline and stop relying on imported skills,” she says.

The Connected Industries Conference at Africa Automation Fair 2019 will focus on the challenges, opportunities and economic impact of the Fourth Industrial Revolution (Industry 4.0 / IIoT) on South and sub-Saharan Africa.

For more information contact Teresa De Sousa, Reed Exhibitions. +27 11 549 8300, teresa.desousa@reedexpoza.co.za, www.africaautomationfair.com

Schneider Electric participates in French-South African Business Forum

Albert Fuchet, Cluster President for Schneider Electric Anglophone Africa, recently participated at the French-South African Business Forum, where he took part in the panel discussion ‘A New Approach: Building skills for the Future’, with the deputy minister of higher education and training, Buti Manamela.

“Schneider Electric South Africa (SESA), has a dedicated sustainable development programme that focuses on creating Access to Energy and Access to Education,” explains Fuchet. “The panel’s themes of Education, Vocational Training and Entrepreneurship, mirror the dedicated efforts of our education programmes, while access to energy is one of the most passionate missions at Schneider Electric, because when you connect people to energy, you change their lives.

“The valuable contribution of SESA’s educational programmes can be seen in the recent signing of a statement of intent with the South African National Department of Higher Education and Training (DHET) to expand their Access to Education training collaboration. It focuses on student development, staff development, as well as curriculum and programme development which Schneider Electric will support through digital education platforms.”

The F’SASEC Network was established by Schneider Electric, in conjunction with the Schneider Electric Foundation and the French Ministry of Education, Higher Education and Research, at five tertiary education institutions across South Africa. The French Ministry made a large contribution to F’SASEC, as it deployed French expert Professor Alexander Sebastiani, who has been based in South Africa since 2011. The primary role of Sebastiani was to transfer best practices from the French education system to the partners that form part of the F’SASEC network. The impact of this approach has been considerable, as the F’SASEC network has incorporated practical training, digitisation to teaching methods, with a key focus on vocational training and life skills training to prepare artisans for industry.

Throughout the F’SASEC network, Schneider Electric promotes and supports voluntary commitment from its employees and retirees through its Teachers’ programme. Teachers are invited to South Africa to teach on subject matters of interest for student training as well as train the trainer courses.

For more information contact Prisca Mashanda, Schneider Electric SA, +27 11 254 6400, prisca.mashanda@schneider-electric.com, www.schneider-electric.co.za
**Parker’s latest products and system solutions**

Parker Hannifin demonstrated its latest products and system solutions that help drive increased productivity and profitability in the oil and gas industry at this year’s ADIPEC. With many decades of experience and materials science expertise, Parker’s solutions are optimised for the corrosive environments and harsh conditions typical of applications within the sector.

Parker’s close to one million innovative, safe, strong and lightweight products solve engineering challenges in key focus areas such as filtration and instrumentation for upstream, midstream and downstream stages in the sector. The company and its unrivalled, knowledgeable distribution network partners with OEMs, engineering procurement companies (EPCs) and distributors. This ensures the optimisation of designs and product selection and supply for efficiency, reliability and asset integrity that helps maximise productivity and minimise costly and sometimes safety compromising downtime.

Amongst the many exhibits featured at ADIPEC were Parker’s autoclave products that included needle and ball valves, pipe fittings and liquid pumps for low, medium and high pressures (up to 1100 bar). Also included was the A Lok fittings range that underlines the company’s expertise in anti-corrosion solutions for oil and gas. Cost reduction and low maintenance optimisation was exemplified by products like the CDAS and OFAS units that provide clean, dry and oil-free compressed air to the most stringent industry standards.

**For more information contact Lisa de Beer, Parker Hannifin SA, +27 11 961 0700, lisa.debeer@parker.com, www.parker.com/za**

**Konecranes and Demag become one company**

As of January 1st 2019, Konecranes and Demag in South Africa will become one legal entity under the new name of Konecranes and Demag. This is in line with a legal entity consolidation of both companies which sees the brands, skills, knowledge and operations coming together as one.

Following Konecranes’ acquisition of Demag worldwide just over two years ago, South Africa was at the forefront of this change by merging the head offices as well as the eleven branches around the country.

The merger of the two global crane giants brings together considerable technical expertise and a wealth of experience going back centuries. Demag was established 200 years ago in Germany, whilst Konecranes came into being 108 years ago in Finland.

“We have been working locally on simplifying the corporate structures of both businesses in an effort to align our brands and product labelling, as well as streamline our efforts and operations,” said Emil Berning, MD of Konecranes and Demag. MHPS, under which Demag operated, will cease to exist. However, all existing contracts will be honoured under the new company. The Konecranes and Demag head office is situated at 60 Atlas Road, Anderbolt in Boksburg.

**For more information contact Konecranes and Demag, +27 11 898 3500, infoza@konecranes.co.za, www.konecranes.co.za**

**BMG celebrates Fenner’s ninety years of business in SA**

BMG – which acquired Fenner Power Transmission (FPT) over 20 years ago – is celebrating Fenner’s 90th year of business in South Africa this year. "The BMG team is proud to be the exclusive distributors of highly acclaimed Fenner products, which have been manufactured in South Africa for longer than any other power transmission brand,” says power transmission business unit manager, Carlo Beukes. “Fenner, which was established in England in 1861, remains the premium brand in power transmission that generations of professional engineers have depended on and trusted.”

BMG’s Fenner range – which consists of transmission and drive chains, vee and wedge belts, tyre and grid couplings, timing belts, sprockets and pulleys and shaft mounted speed reducers – enables BMG to work with all sectors of industry. The company also services the industrial and mining replacement and re-sale markets and is a supplier to original equipment manufacturers.

A strategic decision was made by BMG earlier this year to expand the portfolio, with the addition of Fenner conveyor belting products. Through a long-term agreement with Fenner Conveyor Belting, BMG is now the exclusive distributor of Fenner conveyor belting products locally and in sub-Saharan Africa. Fenner conveyor belting products, which include steel cord and solid woven conveyor belting, are manufactured at the Isando plant according to stringent international quality standards.

BMG is committed to continue leading the way in a highly competitive industry by ensuring the local market has access to world leading products.

**For more information contact Lauren Holloway, BMG, +27 11 620 7597, laurenhy@bmгworld.net, www.bmgworld.net**
Cummins plays key role in SA integrated transport strategy

Cummins is set to play a key role in the integrated transport strategy for South Africa through its partnership with Real African Works (RAW), a newly launched 100% black female owned OEM specialising in urban buses for Bus Rapid Transit (BRT) networks for the three major metropolitan municipalities in Gauteng. Cummins, the world’s largest independent diesel engine manufacturer, which built over 1.3 million units in 2017, began working with the OEM in 2016 on the development of its RAW iBus V1D model. Its involvement began from engine selection, up until road testing.

The technology to be used on these buses is the Cummins ISL Euro 5 engine, which complies with the latest European regulations regarding greenhouse gas emissions and fuel efficiency. RAW CEO, Vuyelwa Toni Penxa revealed that the diesel-engine bus will be

followed by an electric and a hydrogen fuel cell prototype. Bombela has already placed an order for 135 buses, including five electric and five hydrogen fuel cell models for piloting and testing. “I foresee a future based on alternative propulsion methods, as opposed to conventional fuels such as diesel,” said Gauteng MEC for Transport, Ismail Vadi.

Cummins has always been a global leader in terms of diesel engines. The company has committed to investing R700 billion in research and development on electric technology alone, with a trial bus running in California at present, and an additional roll-out planned across the US next year.

For more information contact Amina Abudanpoka Kaguh, Cummins Africa Middle East, +27 11 028 8622, amina.kaguh@cummins.com, www.cummins.com

New product launches for Bearings International

Bearings International (BI) has a few product launches planned for Q1 2019 aimed at ensuring sustainability and even stronger growth. Despite challenging market conditions, BI continues to focus on its unique value proposition of offering the best international brands at cost-competitive prices. What continues to distinguish the company in a market where smaller players are driving prices down is its expertise and service levels. This ensures that customers receive value for money and the lowest total cost of ownership.

A particular success for BI last year was the development of its Agri-Smart solution aimed at cooperatives in the agricultural industry. Agri-Smart allows BI to be an enabler for cooperatives in remote regions, and thereby support farmers with the best products at a fast turnaround, while maintaining excellent price levels. The success of Agri-Smart has showcased BI’s flexibility in adapting to both current market conditions and the specific requirements of its customers.

“We managed to maintain our market position in 2018 due to successful cross-pollination of various product offers,” says sales and marketing director, Conrad Muller. “Careful market analysis and a focused approach will also see BI grow in southern Africa in 2019.” Despite the fact that BI is a powerhouse of international brands, Muller stresses that it is not just another supplier. “Our technical expertise, vast coverage network, stock and client-facing specialists differentiate us from the competition. We evolve around market conditions, new technologies, an improved service offering, and shorter lead times, and can adapt to every unique situation,” Muller concludes.

For more information contact Bearings International, +27 11 899 0000, info@bearings.co.za, www.bearings.co.za

Massive precision lathe for Marthinusen & Coutts

One of the largest lathes on the African continent has been installed at Marthinusen & Coutts’ power generation equipment repair facility in Benoni. This acquisition further boosts its capabilities to conduct high precision machining in-house. The lathe can machine rotors and other components of large electrical and mechanical rotating equipment. With a 3.2 metre swing, it has the capacity to handle workpieces with a mass of up to 40 tons and 10 metres in length. Marthinusen & Coutts now has the ability to offer the machining of very large workpieces in-house, and this will improve both the turnaround time and competitiveness of its offering to customers.

According to works executive Craig Megannon, the lathe was purchased in Europe last year and underwent a substantial rebuild and modernisation to enable automated operation. “This included having it modified to achieve the fine tolerances normally required for the machining of precision power generation equipment,” Megannon continues. “We also upgraded it from semi-automatic operation to a high precision, numerically controlled machine,” he continues.

He adds that the new lathe will especially benefit Actom Turbo Machines, which provides a mechanical maintenance and repair service complementary to Marthinusen & Coutts’ own maintenance and repair service for electrical rotating machines.

Marthinusen & Coutts, together with Actom Turbo Machines, offers a full range of electromechanical services including maintenance, repair and specialised manufacture of electric motors, generators, turbo machinery and other high speed mechanical rotating equipment.

For more information contact Richard Botton, Marthinusen & Coutts, +27 11 607 1700, richardb@mandc.co.za, www.mandc.co.za

For more information contact Bearings International, +27 11 899 0000, info@bearings.co.za, www.bearings.co.za

www.motioncontrol.co.za First Quarter 2019 7
Mining remains a critical player in the macro-economic landscape of South Africa and yet there is still enough potential for the sector to further make a positive impact on GDP and skills development. Government, business, labour and civil society need to ask how they can align a ‘here-and-now’ emphasis on job creation while focusing on digitalisation. This will enable South Africa to become more competitive globally and ensure that we increase digital skills in the industrial sector whilst promoting mining as a viable job enabler in the future.

Digitalisation in the mining industry goes well beyond the automation of production. It allows for new approaches to business processes and creates real opportunities to merge the digital and physical worlds. The value of data coupled with machine learning, artificial intelligence and additive manufacturing offers South Africa a remarkable opportunity to create smart mines of the future. For example, imagine intelligent machines able to adjust operating parameters based on information received from other machines. These advanced capabilities will boost production, predictability and scalability while translating to profits.

Digitalisation will contribute to the entire value chain with a shorter time-to-market, increased flexibility in volatile global markets, optimised productivity and safer operations for everyone on site. What must be addressed is how investors and technology leaders can also become educators and skills developers.

The Digital Mining Incubator is a co-creation space focused on developing mining engineering competence. The incubator is integrated into the Wits Tshimologong Digital Innovation Precinct and is aimed at upskilling young individuals who have an interest in the mining sector, as well as disadvantaged individuals interested in actively participating in the future of mining. Together with mentors from Wits, Tshimologong and Siemens, students will be enabled with the necessary tools and skills to effectively transform and develop the South African mining sector.

Sabine Dall’Omo, Siemens CEO for Southern and Eastern Africa says, “Our partnership with Wits and Tshimologong is about advancing the digital opportunities that mining offers our youth. Failing to position the mining sector in South Africa within discussions about the fourth industrial revolution means remaining stagnant on the path towards industrialisation.”

Professor Barry Dwolatzky, director of Wits University’s Joburg Centre for Software Engineering (JCSE) and founder of the Tshimologong Precinct, says, “Having Siemens open a digital incubator dedicated to promoting innovation in mining is a very significant landmark in bringing the benefits of 21st century digitalisation to one of the most critical sectors in the South African economy. The DMI will provide a dedicated platform for developing innovative solutions to some of our mining industry’s greatest challenges, including health and safety, environmental protection and improved productivity.”

“At Siemens we believe that there needs to be genuine investment towards the localisation of technology and the development of digital talent to enable a strong, future-oriented workforce. The integration of digitally adept youth into the world of work will not only inspire new ideas, it will also transform and advance industries,” concludes Sabine.

For more information contact Keshin Govender, Siemens South Africa, +27 11 652 2412, keshin.govender@siemens.com, www.siemens.co.za
Tool-free installation in 3 easy steps: the AX8000 multi-axis servo system.

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Rockwell Automation has appointed Henry Craukamp as managing director for sub-Saharan Africa.

Bosch Rexroth has appointed Tillmann Olsen as regional president Africa for Bosch Rexroth AG.

Konecranes has appointed Emil Berning as managing director.

Contitech has appointed Laurance Fineberg as product manager for industrial fluid hose.

Hytec South Africa has appointed Klaus Marggraff as business development manager.

Hytec South Africa has appointed Andre Lindeque as engineering manager.

HAW has appointed Neville Alberts as branch manager for Johannesburg.

Metal Work Pneumatics has appointed Christiaan Kotze as sales engineer.

Metal Work Pneumatics has appointed Jen Smook as executive assistant.

Bearings International has appointed Shaun Combrinck as product manager.

Bearings International has appointed Victor Strobel as customer offer marketing manager.

WearCheck has appointed Quentin Gustav von Kleist as technical support consultant.

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Music festival is a flying success

One of the most spectacular stunts ever achieved at a live music event in South Africa involved flying a replica helicopter across the stage at the Afrikaans is Groot festival at the Sun Arena in Menlyn, Pretoria. This was achieved using state-of-the-art automation and mechatronics technology from SEW-Eurodrive.

The stunt for this yearly music festival was devised, set up and executed by specialist rigging company Film Riggers. “We are primarily a rigging company focusing on the film industry, particularly in-camera rope-based stunts,” explains partner Graham Terrell, who founded the company together with Alard Hufner in 2012. From commercials to documentaries and television reality shows, Film Riggers has established a world-class reputation in the industry. “I do not think the organisers expected this level of rigging automation, especially from a South African company,” says Terrell. “Nobody is able to automate a live show like we can, and no local rigging company has a similar level of experience and expertise. The alternative was to turn to an international company, which would have been prohibitively expensive.”

Key to the success of Film Riggers has been its longstanding relationship with SEW-Eurodrive. The winches it devised use the Movidrive drive inverter, including the IPOSplus integrated positioning and sequence control system as standard. The drive inverters have a wide power range, large overload capacity, and a modular design. According to Maxolution engineer Dylan Enslin, they facilitate unrestricted application of AC drives, with a power range of 0.55 to 315 kW, featuring the most modern digital inverter technology.

Terrell says that as a rigger he has been using SEW-Eurodrive products for over a decade. The Afrikaans is Groot event required four Movidrive drive inverters with CMP motors. These consisted of two 11 kW units and two 30 kW units, in conjunction with four 2.2 kW Moviaxis multi-axis servo inverters with CMP motors. Film Riggers also made use of three standard 2.2 kW AC motors driven by Movitrac Inverters. Synchronisation and coordination was achieved by means of a MOVIPLC motion controller. SEW-Eurodrive also supplied off-the-application modules for the operational controllers for the coordinated drives. This software provides for a range of functionality, from accurate speed control to precision positioning and torque control.

A major advantage for Film Riggers is that it has been able to take advantage of the latest developments from SEW-Eurodrive in automation and mechatronics. The basic winch it devised from the outset simply comprised an AC motor with a brake, running off a Movitrac MCO7 variable speed drive, which is an open-loop system with no encoder. This is the most manual or basic form of an electric winch.

Movidrive represents next-generation technology, incorporating servo motors with encoders where the positioning and control are very specific. This is far more accurate and safer than having a person with a remote control driving the winch. Instead, Movidrive allows for the winches to be preprogrammed, which means that all actions are repeatable, with no possibility of error or mishap.

Film Riggers was tasked by the Afrikaans is Groot production team to coordinate the moving and lifting of setpieces that were required to be airborne, in addition to moving performers around the stage. “The beauty of the Movidrive is that it is modular, which means we can use one to four, and have them all interlinked,” Terrell continues.

The replica helicopter flown across the stage consisted of a metal frame with a moulded fibreglass skin, weighing 300 kg, with an extra 100 kg added for an occupant. The initial idea was simply for a basic take-off and landing, but by using four Movidrive units, Film Riggers was able to achieve the spectacular effect of simulated flight on the stage. This meant moving from right to left, in conjunction with moving up and down. Not only was the angle of flight adjustable, but the nose section could be moved up and down as well.

Enslin emphasises that Moviaxis is an even more advanced evolution of the entire system, allowing for extremely refined resolution and feedback, and lightning fast reaction time to any changes in the drive speed. “Our brief from Afrikaans is Groot was to deliver a live stage show that superseded anything done before. This would not have been possible without the technology and support from SEW-Eurodrive,” Terrell concludes.

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www.motioncontrol.co.za First Quarter 2019 11
A bionic flying fox

The dream of flying is one of the oldest known to humankind. In Festo’s Bionic Learning Network, flying is a recurring theme. In association with universities, institutes and development companies, Festo has for years been developing research platforms where the basic technical principles are derived from nature.

For the BionicFlyingFox, the developers took a close look at the flying fox’s special characteristics and implemented them in an ultra-lightweight flying object. With a wingspan of 228 cm and a body length of 87 cm, it weighs just 580 g. The flying fox belongs to the order Chiroptera – the only mammals that can fly. A particular characteristic is their fine elastic flying membrane. This consists of an epidermis and dermis and stretches from the extended metacarpal and finger bones down to the foot joints. In flight, the animals control the curvature of the flying membrane with their fingers, allowing them to move aerodynamically through the air. The wing kinematics of the BionicFlyingFox are also divided into primaries and secondaries and covered with an elastic membrane. As with the biological model, all the articulation points are on one plane, so the it can control and fold its wings together individually.

The BionicFlyingFox communicates with a motion tracking system that constantly records its position, plans the flight paths and delivers the necessary control commands. An important part of the motion tracking system is two infrared cameras, which rest on a pan-tilt unit. They detect the flying fox by means of four active infrared markers attached to the legs and wing tips. The images from the cameras go to a central master computer. This evaluates the data and externally coordinates the flight like an air traffic controller. The wing movements required to ideally implement the intended courses are calculated by the flying fox itself with the help of its onboard electronics and complex behaviour patterns. It gets the control algorithms from the master computer, where they are automatically learnt and constantly improved. The BionicFlyingFox is thus able to optimise its behaviour during the flights and follow the specified courses more precisely with each circuit flown.

The primaries and secondaries can be activated in any state so that the wings move harmoniously. The primary is coupled to the secondary and follows the latter due to forced kinematics, whereby dead centres in the movement are prevented. A nine gram lightweight brushless DC motor in the body of the flying fox drives these flying kinematics by means of a gear ratio. The folding mechanism on the wings can be individually and infinitely adjusted using two small linear drives.

The BionicFlyingFox can also manage a tight flight radius despite its large wingspan. This is made possible by its ingenious kinematics. It works according to the scissor principle. The primary folds in during the upswing and spreads back out for the powerful downswing. This effect is achieved by a sophisticated mechanism: the angular and rack-and-pinion gear units implement the wing movement synchronously with the help of forced kinematics. Inertial sensors on the on-board electronics monitor the flying manoeuvres and correct with corresponding control signals if needed. Besides the ingenious kinematics, the flying fox also owes its agility to its lightweight design. The same applies in engineering as in nature: the less weight there is to move, the lower the energy consumption.

The artificial flying fox provides important findings for industrial automation. In the factory of the future, intelligence from the central control system will be divided into subsystems and components. Even single workpieces will become intelligent and know what product they are supposed to be made into. They will accordingly be able to communicate with the machines and tell them how they must be processed.

In the case of the BionicFlyingFox, the intelligence is also decentralised: the master computer specifies the flight paths and control commands. During the flight, it compares its calculated intended courses with the actual ones and adjusts these with increasing efficiency using machine learning. It detects how it must control the wings and legs in order to implement the commands from the master computer in an optimal manner.

With the artificial flying fox, Festo has now technically implemented the unique kinematics of Chiroptera and decrypted the last flying behaviour from the animal world within the framework of the Bionic Learning Network.

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Your **Training** partner in **Condition Monitoring** Since 1986

The Vibration Institute of South Africa (V.I.S.A.) was formed in 1986. Over the years the institute has held numerous very successful training courses in Johannesburg, Durban and Cape Town, with well over 6000 participants from all over the world. V.I.S.A.’s courses are presented by V.I.S.A.’s own lecturers as well as by local and overseas guest lecturers, bringing many years of combined experience to the classroom. The courses are held at professional training venues or Smaller, tailor-made, in-house courses can be held at your own plant. V.I.S.A.’s programme focuses on machine-Condition Monitoring and Asset optimization through courses such as Vibration Analysis, Electric Motor Diagnostics, Alignment, Balancing, Lubrication Analysis, Data Collection & Analysis, Transient Data and Modal Analysis. V.I.S.A.’s training vision is to equip our participants with the necessary insight and skills to be proficient and successful in the world of Reliability and Condition Monitoring.

**Category 1 - ISO Vibration Analyst Course**

The Vibration Analyst Introduction course is intended for newcomers or for personnel who have limited vibration analysis experience. The course focuses on periodic, single channel data collection and analysis for predictive maintenance programmes. A foundation is established for in-depth understanding of spectrum and waveform relationships. Review of condition monitoring technologies - Vibration, oil, wear particle, infrared, acoustic emission, electric motor testing. Review of failure modes and appropriate use of condition monitoring technologies.

**Category 2 - ISO Vibration Analyst Course**

The Vibration Analyst Intermediate course is intended for personnel who have at least twelve months vibration analysis experience and a thorough understanding of vibration theory and terminology. The course provides an in-depth study of machinery faults and their associated spectrum, time waveform and phase characteristics. Additional topics covered include: signal processing, data collection and corrective actions.

**Category 3 - ISO Vibration Analyst Course**

The Vibration Specialist Advanced course is intended for personnel who have at least 5 years vibration analysis experience and a thorough understanding of vibration theory and terminology. The course provides an in-depth study of diagnostic measurement techniques and the associated applications of the techniques.

**Any Questions?**

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**AVENG ACS**

Complete Process Control Solutions and Services Provider
Simex, a South African company specialising in the fabrication and upgrading of flight training devices like flight simulators, contracted Tectra Automation to upgrade software, supply new hardware and adjust and convert a portion of the motion logic control across three flight simulators. The conversions, implemented for software compatibility purposes, pertain to the controls directing inflight aircraft angles (side-slip and shade), the aircraft roll (side-to-side inflight movement) and pitch (altitude increase/decrease).

The simulators benefitting from the upgrades are the Embraer 120 and the King Air 200, 350 and 1900, located at Lanseria airport in Gauteng and a generic twin-piston simulator, based on a Piper Seneca V, at Port Alfred airport in the Eastern Cape. All force-feel and control-loading equipment and componentry used for the simulator upgrades are Bosch Rexroth engineered.

The Embraer 120, an FNPTII (Flight Navigation and Procedures Trainer) MCC fixed-base simulator, which is used for imitation training and proficiency checks, experienced compatibility issues with its motor program and its motion logic controller (MLC) device. As the components are Bosch Rexroth, Simex approached Tectra Automation in Johannesburg for assistance. The fault lay in under-resourced componentry (known as CML) for a program contained within the MLC, which Tectra Automation resolved by replacing the existing CML25 with a CML45 and adjusting the software programming.

Electric drives and controls manager, Wiets Pretorius verified the fault, provided and installed the correct hardware and adjusted the software to ensure compatibility. Commissioning was conducted jointly by Simex and Tectra Automation, and subsequently reconstructed and approved by the South African Civil Aviation Authority (SACAA), the aviation industry regulator in South Africa. “All of this was completed within standard industry time expectations and to our exact requirements,” commented Leon Postma, simulation engineer at Simex.

Based on the successful conclusion of the Embraer 120 project, Simex again contracted Tectra Automation, this time for the other two simulator projects, both of which are ongoing. The Port Alfred-based generic twin-piston simulator had been upgraded with new motors and required higher grade firmware and the King Air three-way simulator (200, 350 and 1900) involved work on its control loading.

The firmware upgrade for the twin-piston simulator, however, proved to be incompatible with the PLC leading to a PLC firmware upgrade. This entailed motor parameter checking and adaption to the motor programming to correct an inverted analog signal – both of which were conducted remotely.

Tectra Automation also supplied all required Bosch Rexroth equipment and components for the control loading of the King Air 200, 350 and 1900 simulator. This aircraft simulator can be adapted to exactly duplicate the aeroplane cockpits of any of the three aircraft types through the use of interchangeable panels.

All Bosch Rexroth hardware has been delivered to site and Tectra Automation is on standby to assist with commissioning once Simex has completed the installation. “For all projects, which first began in 2017 when we conducted upgrades to the Embraer 120, until now with the work undertaken on our two ongoing projects, we have not experienced any unsolvable challenges subsequent to Tectra Automation’s involvement,” said Postma.

“The service we have received from Tectra Automation exceeds even the exceptional high quality of the Bosch Rexroth equipment they represent, if one could draw a quality comparison,” he concluded.

The standard one year Bosch Rexroth warranty on all products and equipment applies, and Tectra Automation provides a 24 hour call out offering as part of its aftersales service.

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Tectra upgrades flight simulator software
For the first time we bring together our core global motion control technologies in a single unifying force. Through insight, intelligence and innovation we provide solutions to meet the increasingly complex demands. This is Parker helping to solve the world’s greatest engineering challenges.

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Support for new space telescope

A new space telescope, for launch into low Earth orbit as part of an electro-optical payload for a satellite, was recently designed and assembled by Simera in Somerset West. To execute the ultra-precise specifications required for the Simera SX1 Imager’s optical calibration, the company contracted Tectra Automation to design and supply a purpose-built assembly tower to integrate and align the telescope lenses.

Requiring a sturdy, highly stable design to mitigate the effects of external vibrations when installing and aligning the lenses, the tower structure was built using the Bosch Rexroth range of heavy duty modular aluminium profiles and accessories. Inside the tower, a vertically translating carriage mechanism was designed to assist with the alignment of optical elements.

To achieve absolute control and smooth guidance of this mechanism, Tectra Automation used Bosch Rexroth ball rail system linear guides with pneumatic brakes for maximum rigidity. Four counterbalances positioned at each of the four corners of the carriage were used to maintain optimum positioning control for the 30 kilogram telescope in the assembly process. The pneumatic brakes were controlled by an Aventics panel whilst a linear scale with digital readout provided an accurate indication of the position of the carriage. The tower was mounted on a solid granite table suspended on vibration isolators to isolate the structure from any possible external vibrations.

“The design and construction of the optical tower provided the highly accurate and smooth vertically translating carriage Simera required to ensure optimum calibration of the telescope lenses,” said Simera mechanical engineer, Rosca de Waal.

The first Mars helicopter will fly with maxon motors

The US space agency NASA has announced that its Jet Propulsion Laboratory (JPL) will be sending a helicopter to the Red Planet on the upcoming Mars 2020 rover mission. The rotors will be controlled by robust DC motors from maxon motor in Switzerland. It will land on Mars in February 2021 while attached to the bottom of the rover. During the first 30 days of the mission it will undertake several autonomous flights, each lasting up to 90 seconds. It will send infight images of Mars back to Earth for the first time. The Mars helicopter technology will lay the way for many future scientific and exploratory missions to Mars. Similar robots could serve as flying eyes for future rovers, exploring the surroundings and finding the best route for the rover.

For the small helicopter to fly, it takes an enormous engineering effort. The thin air on Mars is comparable to the conditions prevailing on Earth at an altitude of 30 kilometres. Even accounting for the reduced Martian gravity, the helicopter must therefore be particularly light (1.8 kilograms) and can only carry small batteries. This requires that the components used are extremely energy-efficient, a characteristic of maxon’s DC motors. The drives from Switzerland have proven themselves in many previous Mars missions and will also be used in JPL’s helicopter. Six DCX precision micro motors with a diameter of 10 mm are responsible for moving the swashplate and hence adjusting the inclination of the rotor blades i.e. for controlling the vehicle.

The helicopter propulsion system is designed and built by AeroVironment under contract from JPL. maxon engineers have been working closely with the specialists at AeroVironment who are world experts in building micro air vehicles. After a year of development work, NASA’s approval for the inclusion of the helicopter project in the Mars2020 mission is an additional motivation for the Swiss drive specialists. “Being part of another Mars pioneering project makes us incredibly proud and happy,” says Eugen Elmiger, CEO of maxon motor.

The Mars helicopter is just one of several other Mars projects that maxon is currently involved in. For example, in the European Space Agency’s ExoMars rover more than 50 drives are located in the wheels, drill head, analysis unit and camera mast. This mission is also scheduled for launch in 2020. In November 2018, NASA’s InSight lander studied the Red Planet’s seismic activity and planet core temperature. A powerful and robust DC motor from maxon drove a pile driver type mechanism that burrowed almost five metres deep into the Martian soil.

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Omron is introducing a new line of Scara robots, boasting a sleek design and enhanced performance. Named the i4, these new generation robots will save space during installation and allow easier configuration into existing production lines. The i4 is fast, repeatable, easy to operate and flexible for multiple configurations and applications.

Manufacturers around the world are facing major challenges in having to produce a high mix, low volume of products, together with shorter product lifecycles, while dealing with labour shortage issues. Therefore, manufacturing companies must maintain flexibility in quick changeovers and production line layout changes. They are also challenged by sudden stops, and more than ever need to meet the demands of high accuracy and speed during assembly processes.

To meet these challenges, the i4 line features better communication through EtherCAT, enabling synchronisation between other automation devices. This facilitates advanced assembly, inserting and mounting processes that require high accuracy and demanding throughput, as well as ensuring quality control with vision integration.

The i4 also visualises working data and supervises its status with the world’s first built-in signals for preventive maintenance. The i4 communicates with users to reduce unscheduled downtime, using a light ring and display embedded into the base that indicates which operations to perform at the right times. The light rings are the world’s first robot health lighting indicator, informing users of current modes such as ‘warranty update required’. Manual checks and maintenance plans are no longer necessary.

• **High speed and high accuracy**: The i4 has EtherCAT connectivity, which allows the i4 robots to communicate easily with other equipment in the production line. By synchronising the i4 with Omron devices such as controllers, vision sensors and servo motors, customers can set up the optimal production line with high speed and accuracy. This allows complex assembly tasks that were not possible before.

• **Satisfying flexibility needs**: The i4 Scara family meets a wide range of customer needs, optimising machine cost and overall performance and enabling more flexible line expansions. In 2019, Omron will introduce the first three models: the i4-650, i4-750 and i4-850, which have an arm reach of 650 mm, 750 mm and 850 mm respectively. The payload can hold up to 15 kg, which is three times heavier than before. Customers also have a choice of two different Z-axis strokes (210 mm and 410 mm) for each robot. Special models include the IP65, Clean Room ISO 4 (Class 10), ESD and models that use H1 grease – all meeting the specific needs of various industries and applications. The i4 will also come with an inverted model with the same sophisticated design.

The launch of the i4 series is part of a larger Omron strategic concept, the innovative-Automation! initiative, which aims to innovate in the manufacturing environment. By introducing the new Scara family, Omron continues its mission to contribute to labour saving and productivity in the manufacturing industry.

For more information contact Omron Electronics, +27 11 579 2600, info.sa@eu.omron.com, www.industrial.omron.co.za
For 118 years, White Hart Lane, home of Tottenham Hotspur Football Club, has been one of the most famous addresses in football history and the stadium has hosted some of the team’s most dramatic moments. At the very heart of the stadium, the pitch has been transformed from a simple patch of grass into an ambitious engineering project. As well as being home to Tottenham Hotspur Football Club, the stadium will now host NFL games in the UK, and to accommodate both sports, the stadium boasts the world’s first dividing pitch.

Matches at the new stadium will be played on the world’s first dividing, retractable grass football pitch. Mounted in three enormous trays, the grass surface can be rolled away beneath the south stand to reveal an artificial NFL American football field beneath. The retracting pitch means that the stadium can quickly convert from hosting a football match on the grass pitch to an NFL game on the artificial field in just a few hours. The football club turned to Sheffield-based engineering firm, SCX to help deliver the retractable pitch. SCX specialises in complex kinetic architecture.

The columns that support the terracing underneath the south stand prevented the pitch from being rolled out from beneath as a single entity. Instead, SCX opted to split the pitch into three lengthwise sections that divide roughly along the outer edges of the penalty box. Each section is mounted on rails that are hidden beneath the NFL pitch, which allow them to be rolled in and out of position through a complex set of manoeuvres from under the south stand.

Joining the pitch
The whole pitch weighs over 9000 tons, more than the Eiffel Tower. Each of the three sections needs to fit together seamlessly so that the fans and footballers cannot tell that matches are happening on trays mounted 1.6 metres above solid ground. Achieving the accuracy required to get this kind of join along the entire 118 metre edge was one of the most difficult aspects of the project. Each section, composed of 33 metal trays welded together from 16 mm steel plates, needed to line up perfectly when brought together.

The project team discovered that the best way of ensuring a reliable and repeatable joint was to have the trays touch via a three-ply rubber strip running down the entire length of each section of pitch, just beneath the turf. The engineers at SCX also tested how best to pull the pitch apart again because when the sections are joined, the grass can become entangled as roots and leaves grow. The team found that the best approach was to simply let the turf tear naturally as the sections pulled apart, allowing it to split along its own weak points. When complete, the trays were lined with a waterproof layer before matting, gravel and soil were placed on top. Then the turf itself was rolled out over the top.

On the move
Every second tray in each section is powered by 68 electric motors, with the ones on the centre rail doing most of the work, and the motors on the outside rails powering opposing wheels, running diagonally opposite. Together, they give each section a top speed of seven m/min. Once the goals, advertising boards and pitch surround are removed, it takes two people just 25 minutes to roll the pitch away.

To switch from one event to the other takes four hours. As the pitch is rolled away, one operator walks in front of the moving section while another, the watcher,
observes the pitch’s progress. Moving the pitch sections requires both operators to continually press down their safety buttons. An automatic slow-down system is triggered as the huge pitch sections trip sensors when the sections are 75 centimetres apart. This slows the movement down to a tenth of its top speed – 7 cm/sec – before triggering a second and third sensor that brings the whole structure to a halt. The motors themselves can be used to slow and brake the pitch while it is moving. Once it has stopped, a parking brake is applied to clamp the structure in place. The outer sections then move inwards to meet the centre of the pitch with the help of 32 hydraulic cylinders on the steel structure underneath.

Once the pitch is in place, hydraulic cylinders raise the sidelines before the flaps are lowered to rest on the edge of the turf. Ramps on each corner of the pitch also pivot upwards with the touchlines to give access from beneath the stands. Then the entire structure is locked into place. A third set of flaps hides a series of growlights and sprinklers that can be wheeled out over the pitch between games to give the grass some extra light and water. There are six giant trusses, each carrying 126 growlights, that span the entire width of the pitch and weigh just under 20 tons each, which can be rolled out on a rail hidden underneath the touchline. Hydraulic ramps on either side allow the height of these to be adjusted so that the amount of light the grass receives can be tuned.

Flexible but stable
With something of this size raised off solid ground, there was a danger that it could behave very differently from standard football pitches. Running on a large steel structure suspended above the ground will cause it to bounce, so the team faced the challenge of making sure the whole structure did not turn into a giant trampoline. The team fitted a series of accelerometers around a football field during a game to monitor vibrations and find out how a normal pitch behaved. Widening the main structural beams allowed the engineers to tune the pitch to the right frequency, so that it felt like solid ground.

While the structure needed to be solid, it also had to be flexible. Changes in temperature could cause the steel frames to expand and contract, meaning the pitch can grow or shrink by up to 45 millimetres in all directions. To cope with this constantly changing size, engineers designed the 598 wheels that support the pitch sections so that they do not slip off the rails as it moves. Each section of pitch runs on three rails, and the wheels on the central rail have a flange on both sides to keep the trays running in a straight line.

The front wheels of each pitch section were also fitted with steel scrapers and brushes to clear the rails of any dirt or debris that might get washed down onto the rails. While a waterproof liner seals the pitch trays to prevent any sand or soil spilling down onto the rails, bad weather can wash debris under the pitch, meaning this cleaning mechanism is essential. An integrated watering and drainage system in the pitch ensures that the grass can get the nutrients it needs to grow without making the ground beneath waterlogged. The systems can be quickly disconnected when the pitch needs to be moved. When the pitch is stored under the stands, LED lights provide the grass with just enough light to stay alive but not enough to cause it to grow. A ventilation system also pushes air over it to prevent it from becoming too hot, cold or damp.

Always prepared
Over the years, SCX has learned that an over-engineering strategy is the key to success in this sort of large moving project, because it is hard to know exactly what obstacles might need to be overcome when it is operating. It pays dividends to have extra capacity in hand.

SCX finished installing the pitch in October 2018 – just over six years since it first started working on the project – and the first matches are set to be played in 2019. This feat of engineering may mean that the stadium will become almost as famous for its world-first pitch, as it is for its football team.

This article was originally published in issue 77 of Ingenia, the Royal Academy of Engineering’s quarterly magazine (www.ingenia.org.uk).
New Siemens converter series

Siemens is launching the brand new Sinamics G120X converter series for use in pump and fan applications in industries such as water, wastewater and building technology. With a power range of 0,75 to 630 kW, these converters can be operated with any motor. They are at their most effective running with synchronous reluctance motors from Siemens. They are configured for cost-optimised and resource-saving operation across all voltages and supply networks, and their compact design saves space in the control cabinet. The integrated safety functions are certified to SIL3. These converters offer outstanding ease of operation and are simple to commission using the Sinamics Smart Access Module and the IOP-2 operator panel.

Their integrated DC link reactor enables them to run with the utmost stability under all network conditions. A high C2 (optionally C1) EMC category and a protection rating of IP20 (optionally IP21 in UL open type) ensure that the converters can be reliably used in any kind of industrial environment. Sinamics G120X converters are in compliance with all relevant EU energy saving standards, and offer an operating efficiency level of over 98%.

Sinamics G120X converters can be linked to MindSphere over Sinamics Connect 300, offering users the opportunity to analyse valuable operating data using the MindSphere app, Analyze MyDrives. This enables the visualisation and analysis of status information, providing users with valuable data which can be used as the basis for optimising processes and maintenance strategies.

For more information contact Kaylin Pather, Siemens Digital Factory and Process Industries and Drives, +27 11 652 3652, kaylin.pather@siemens.com, www.siemens.co.za

Energy saving with Zest WEG

Operating an irrigation system can be expensive, with one of the primary factors being the cost of energy. However, significant savings can be realised by leveraging available technology to provide an appropriate electric motor and variable speed drive combination that will reduce operating costs while providing reliable performance. WEG IE3 top premium efficiency motors and variable speed drives (VSDs) from Zest WEG will do just that.

For example in a pivot pump application which operates for 4000 hours in a single year – relative to two planting cycles – WEG IE3 top premium efficiency motors not only offer maximum ingress protection with a higher winding insulation system to increase motor life expectancy, but also offer efficiencies of up to 96,6%. Benefits can also be seen when compared against IE1 standard efficiency motors. Using a 22 kW 2 pole at 75% of full load, an IE1 motor with an efficiency of 91%, measured against a WEG IE3 motor with 93% efficiency, has estimated savings of R2100 per year.

Much higher savings can also be realised by using a WEG VSD in combination with a WEG motor. An IE1 electric motor, again operating for 4000 hours per year at 91% efficiency, will consume about R93 800 worth of energy using old technology. The same performance could be achieved using a VSD to reduce the motor speed while reducing the energy absorbed. For a 10% reduction in operational speed using the VSD, further savings of 22% to 27% could be achieved.

For more information contact Zest WEG Group Africa, +27 11 723 6000, info@zestweg.com, www.zestweg.com
Soft starters limit the inrush current, improving overall stability of the power supply, and reducing transient voltage drops which may affect other loads in a network. They are ideal for applications demanding high performance in terms of control and protection during motor startup and operation. They can also avoid pressure surges and prevent water hammering (normally a big problem) in pump applications. Conveyor belt systems can be started smoothly, avoiding jerk and stress on drive components. Fans or other systems with belt drives can be started slowly, avoiding belt slipping.

The new ADXL series from Lovato, distributed by ElectroMechanica (EM), comprises modern, state-of-the-art, compact soft starters for three-phase motors from 7,5 to 160 kW in four frame sizes. The soft starters allow for control of starting, stopping, monitoring and protection, with integrated functionality for an extremely efficient starting solution. A bypass facility is provided on all sizes, which operates when the startup function has completed, thus reducing power losses and saving energy. A wide operational voltage range of 208 to 600 V AC, a compact design and advanced functionality make the ADXL series a highly efficient solution for most applications in all industries. Two-phase control during motor starting and stopping, combined with torque control during operation, provides optimised ramping characteristics. This ensures smooth start and stop functionality for all applications, significantly increasing lifespan of connected motors and power transmission devices. Hence the ADXL series is an excellent choice for pumping applications where water hammering is normally a major problem. Kick-start functionality delivers high torque only during the initial starting period, permitting motors to be started when initial torque is insufficient to overcome friction.

The ADXL series is equipped with built-in electronic overload protection, protecting the motor from overheating. No additional overload device is required, saving space and installation time. A backlit LCD icon language neutral display is incorporated on the fascia for quick and easy configuration and visualisation of all measurements and status parameters. Alarms and text can be displayed in any of six languages. Icons indicate default application setup in use, while graphic bars indicate the motor and internal thyristor temperatures, and an alphanumeric display shows texts and measurements as well as the current status of the starter. Input and output functions are pre-configured to the most common settings, but can be easily overridden to adapt the soft starter to specific application needs.

The ADXL series incorporates two counters dedicated to count the number of startups and motor operating hours to set possible thresholds to activate an alarm for potential maintenance purposes. Set-up is a breeze, as the ADXL soft starters are supplied pre-configured out of the box for most common applications such as centrifugal pumps, firefighting pumps, conveyer belts, fans, mixers and general purpose. Selecting the required application automatically updates the parameter programming to the requested application.

Programming can be done via the front four button controls, together with the icon display, or via a front-mounted optical port that can be configured to connect to a computer via USB or WiFi using optional accessories, or simply via Near Field Communication (NFC), using compatible smartphone or tablets, even with the starter turned off.

All ADXL series soft starters are equipped to receive a dedicated RS-485 Modbus communication card, permitting constant monitoring of all starter measurements, or to connect to an optional remote keypad with display to view the measurements, or to perform the set-up on the front of the enclosure.

For more information contact Karen Zotter, ElectroMechanica, +27 11 249 5000, karenz@em.co.za, www.em.co.za
Rockwell technology optimises tyre processing plant in Port Elizabeth

Rockwell Automation’s Gauteng-based systems and solutions (SSB) team has executed two separate projects at a tyre processing plant in Port Elizabeth. The back-to-back projects will assist the manufacturer to maintain continuous and safe production.

The first project (the rubber mill feed project) included the design and implementation of a Rockwell Allen Bradley PowerFlex AC variable speed drive (VSD) solution, forming part of the manufacturer’s in-house optimisation project. It involved the addition of a two-roll rubber feed mill to aid in meeting the critical demand of downstream processes.

The second project (the Banbury mixer project) involved replacing obsolete drives for one of the plant’s Banbury mixers. Allen Bradley PowerFlex modular DC drives were implemented with a Rockwell Connected Enterprise approach.

Rubber mill feed project
This project entailed the expansion of the rubber feeding process by the addition of a standalone two roll feed mill. The rationale was to have redundancy in the event of a drive or mechanical failure. The new mill furthermore allows for variable speed operation, optimally feeding the calendaring process.

The scope of work included the design, construction and commissioning of a VSD panel for the 150 kW, 400 V AC feed mill motor. A PowerFlex 755 was chosen for this application. This allowed expansion by installing multiple digital I/O, feedback and safety option cards, with the additional benefit of on-board programmable logic.

Rockwell Automation implemented the control philosophy provided by the machine-motor integrator for the project. This included programming software functionality in the VSD using the on-board DeviceLogix and integrating speed control encoders with an Allen Bradley safety relay.

Banbury mixer project
The Banbury mixer project involved replacing four obsolete third-party drives and their panels used for one of the manufacturer’s Banbury mixers. The mixers are used to mix the raw materials that form the rubber compound.

The Rockwell Integrated Architecture-based solution, which allows for Ethernet enablement, replaced the older hard-wired technology. The migration of the safety and control of the mixer drives on to the newly installed GuardLogix safety PLC provides the ideal platform for future complete mixer control upgrades.

Two 0.75 MW total motors drive the mixer through a common gearbox. Essentially, four DC drives were replaced with a two-drive modular system using locally sourced Semikron SCR power modules interfacing to an Allen Bradley standalone DC Drive Regulator (SAR) module. This removes the requirement of having two drive interfaces per one motor, at the same time reducing system complexity, and minimised failure potential due to physical segregation and electrical isolation of power and control devices.

Each 0.75 MW DC motor is fed from a 30 degree phase shifted, 550 V AC dual supply, which makes up a 12-pulse drive. The PowerFlex DC SAR module is scalable up to four parallel power units, either regenerative or non-regenerative. A major safety net is provided with a PowerFlex SAR-based 12-pulse arrangement in that cross conduction (plus to minus) cannot take place between two regenerative SCR bridges. The scaling of voltage and current feedback to the SAR is fully programmable. It is thus also ideal for retrofitting applications where existing SCR stacks are re-used.

In the case of the Banbury mixer, any of the two identical SAR interfaces can be configured to be the master drive for the system. This prevents the dependency on one specific drive to always be available. One motor can be shut down and the machine operated at reduced capacity. There are no direct power connections between the two new drive panels, which are separate.

Interfacing with the third-party PLC was done through an Allen Bradley networked Point IO, communicating to the safety PLC and drives via a Stratix 5700 managed switch. This permitted sufficient network integrity to handle critical communications like safety I/O and load sharing between motors. Controlling all the electrical safety devices directly in the new drive panels resulted in an 80% field wiring reduction and also enabled pin-point fault-finding.

One of the challenges overcome was the tight time frame right through from order acceptance to project completion. Another was to remove the old and install and commission the new panels, working in a confined and raised electrical room together with the Rockwell Automation appointed installation company.

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Retrofit of sheet metal warehouse

Peter Huber recently upgraded the sheet metal warehouse for a laser cutting system at its Bystronic headquarters in Niederönz, Switzerland. Through the use of PC-based control, the facility now meets current requirements with improved availability and enhanced remote maintenance capabilities.

Bystronic is one of the world’s leading providers of sheet metalworking solutions. The company’s portfolio includes laser cutting systems and press brakes, along with associated automation and software solutions. Mario Duppenthaler, head of solution and software management, explains: “The recently updated high-bay racking system is part of our plant’s processing platform for a wide range of sheet metal components used for our own laser cutting systems. It consists of two storage towers with a total of 83 bins. The maximum storage capacity is 249 tons. To remove items, a storage and retrieval device travels to the respective bin and transfers it to a Bystronic handling device, which removes the requested part and moves it via an automated transfer cart to the changeover table of the laser cutting machine.”

The modernisation project was handled by Peter Huber. The full service provider of control solutions for sheet metalworking, and a Beckhoff solution provider since 2010, employs PC-based control for new designs of machines and robotic systems as well as for retrofits. General manager Erich Schumacher confirms the role that a smart retrofit can play in increasing overall production efficiency: “As equipment ages, the availability of the entire facility depends to a large extent on the availability of the individual control components. This is where the long term availability of Beckhoff technology is essential. In this particular warehouse, PC-based control replaced 20-year-old technology where components were no longer available and Eprom-based software was no longer adaptable to today’s requirements. PC-based control technology finally enabled the use of modern remote maintenance capabilities. From an operator’s perspective, component availability and remote maintenance are even more important than the potential performance improvements that can be achieved by automating a legacy system.”

For Erich Schumacher, openness and modularity were the main arguments for deploying PC-based control technology from Beckhoff, especially in retrofit projects: “With PC-based control, you can design the control and I/O systems precisely in accordance with the individual machine requirements. For example, the modular system of I/O terminals allows you to place small control boxes exactly where you need them if you want to keep using existing cable harnesses. This means that there is no need for expensive machine rewiring. We also appreciate the consistency of the system, because all industrial PCs, from the smallest to the largest, run the same automation software. This simplifies our work considerably, particularly with retrofit projects, because the time to install these upgrades is often very limited since clients want to have their production up and running again as quickly as possible.”

At the centre of the upgraded system that controls all storage workflows and the handling device is a Beckhoff embedded PC running TwinCAT control software as well as TwinCAT PLC HMI software for visualising workflows on a 30 cm multi-touch control panel. The motors in the sheet metal storage system are controlled via two servo drives with integrated TwinSAFE cards for motion safety functions. The I/O system consists of four EtherCAT couplers, two EtherCAT junctions and 50 EtherCAT terminals, including extremely compact high density digital terminals as well as TwinSAFE input and output terminals.

Having system integrated safety technology is a particularly important aspect for Erich Schumacher: “The safety features must not be separate from the overall control system, because having a complete data-related overview of the total system is critical if problems arise. That’s why all safety functions – such as emergency stop, safety gates and light barriers, as well as position monitoring of the two transfer carts between the handling device and the changeover table – are implemented via TwinSAFE terminals and the TwinSAFE cards in the servo drives.”

Mario Duppenthaler mentions yet another advantage of having an integrated system: “We plan to link the sheet storage facility more closely with the higher level ERP system in the future. For example, we want to integrate the warehouse into the so-called cockpit, a live monitoring solution that will visualise all of our production data. We are also working on a detailed systems analysis of the sheet warehouse, which is particularly important for preventive maintenance,” he concludes.

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Solution for wastewater treatment

Industrial gear units and geared motors from SEW-Eurodrive South Africa are ideal for demanding applications such as agitators, mixers and aerators. Local OEM, Wamechsi Group has standardised on SEW products for a range of wastewater treatment plants it has built throughout the country. This is largely due to the quality and reliability of the SEW technology.

The OEM manufactures a range of mechanical equipment for the various stages of the treatment process at a wastewater treatment plant, ranging from mechanical screens to washers and screw presses that wash and compact the material to be removed. Ancillary mechanical equipment includes screw pumps, surface aerators and clarifiers.

The biological aspect of the treatment process results in sludge that is processed further by digesters. The final stage of the treatment process involves removing the sludge with dewatering machines. Manufacturing equipment for thickening and dewatering applications is a particular area of expertise for Wamechsi. Established in 1997, the company has transformed into the largest OEM of its kind in South Africa. Its extensive manufacturing capability includes state-of-the-art laser and plasma cutting, CNC lathes and milling machines, submerged-arc and robotic welding, and ancillary equipment such as 24 five ton overhead cranes. The OEM acquired its first SEW products in 2012, in a long-standing partnership predicated on good design, reliability, quality and excellent aftermarket support and service.

The OEM's latest projects to feature SEW products are Virginia Phase Two (six 75 kW industrial gear units specifically for aerators), an additional 22 geared motors for Theronia, and 15 geared motors for mixers at Buschkoppies. Phase One of the Virginia project has already been completed, while Phase Two is being commissioned. “The main reason that we have been so successful in this industry to date is largely due to our innovation and SEW’s reliable product range,” explains Wamechsi CEO, Jurie Niemand.

SEW sales representative, Willem Strydom adds that SEW’s extensive experience and track record in the wastewater treatment industry means the company is able to offer flexible and highly reliable total solutions. It is a leading manufacturer of industrial gear units and geared motors, as well as a large range of optional equipment, which ensures reliable drive solutions for the wastewater treatment industry.

Industrial gear units from SEW are ideal for applications where a high performance level is required for mixing and agitating liquid or paste-type substances. Apart from wastewater treatment, they also include applications in the chemicals, food and beverage, and mining industries.

With its flexible product platform, SEW offers a load-specific bearing concept. In addition to the transmitted torque, high radial or axial forces are often supported by the output shaft. No matter whether the process is horizontal or vertical, SEW has the expertise to be able to provide the optimal solution.

“With aerator and mixing applications, our projects and engineering teams have to double check all of the loads and bending moments. These loads are supplied to us by the client, based on their designs. We then ensure that the gearboxes selected are suited to the application at hand,” Strydom continues.

This goes hand in hand with commissioning and maintenance support as required. SEW employs a special program designed specifically to determine if the gearbox selection is adequate, based on the loads and bending moments. This is particularly important when it comes to aerators and mixers. SEW therefore selects the optimal gearbox for the application at hand.

Commenting on the current state of the wastewater-treatment industry, Niemand stresses that it is growing exponentially due to the rapid population expansion and high rate of urbanisation. “The need for infrastructure is coupled to the universal right to access water and sanitation services, which commits the government to significant capex in these sectors.”

A major challenge in this regard is that South Africa is classified officially as a water stressed country, which means that this valuable resource has to be conserved as much as possible. “We are now busy with projects where final effluent is being treated to become potable water. Therefore it is critical for our major component suppliers like SEW to be at the cutting edge of technology,” Niemand explains.

“The wastewater treatment industry not only generates much needed employment, but is essential for continued economic development, as the country’s residential needs cannot be met without this essential enabling infrastructure being put in place first,” he concludes.

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BMG’s range of Nord aluminium drives is available with the Sealed Surface Conversion System anti-corrosion treatment (nsd tupH, which has been developed by Nord Drivesystems for improved process reliability in extreme environmental conditions and for hygienically critical applications.

“Nord’s nsd tupH surface and corrosion protection system, which is resistant to acids and alkalis, is a highly efficient anti-corrosion treatment for gear units, smooth motors, frequency inverters and motor starters in washdown optimised cast aluminium housings,” explains Derrick Louw, Nord product specialist in BMG’s Electromechanical Division. “BMG’s Nord nsd tupH drive units are a robust alternative to painted geared motors or stainless steel versions. The nsd tupH catalytic surface treatment process permanently bonds a high hardness layer to the aluminium substrate to offer the same corrosion resistance as stainless steel. Advantages include extended surface life, a substantially lower mass, improved installation options and cost efficiency.

“Nord’s easy to clean surface treatment is not a coating like a paint layer, that can detach or flake off. This durable protective layer offers optimum protection against scratching, blistering and the penetration of corrosion, even if the unit is damaged. This surface conversion system is highly resistant to extreme environments and aggressive cleaning chemicals, even under high pressure washdown conditions.”

Nord drives with nsd tupH comply with FDA Title 21 CFR 175.300 and for this reason are suitable for food applications. They have been successfully tested according to ASTM D714 (blistering), ASTM D610-08 (corrosion), ASTM D1654-08 according to DIN EN ISO 2409 (scratching), ASTM B117-09 according to DIN EN ISO 9227 (salt spray test) and ASTM D3170 (Gravelometer). In addition, resistance to common cleaning agents used in the food industry has been confirmed in tests.

All DIN and standard components for the nsd tupH aluminium drive units, including drive shafts, are made from stainless steel. Fanless smooth motors, which run quietly, do not spread germs. They are available as synchronous and asynchronous motors and comply with efficiency classes IE2 and IE3 (asynchronous motors) and IE4 (synchronous motors).

Typical applications for Nord drives with nsd tupH surface treatment include the food and beverage industry, bottling and canning plants, water treatment and sewage plants, as well as offshore and onshore applications. This range is suitable for use in any plant that requires a washdown after production.

The Nord range, which is assembled locally by BMG according to stringent international quality and safety specifications, has earned recognition by the local market for reliability, high efficiency, reduced noise levels, extended service life and minimal maintenance requirements.

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HYDRAULICS

Reducing energy costs by 68%

In a first for South Africa, Tectra Automation and Hytec collaborated to aid a motor vehicle OEM reduce energy costs at its Port Elizabeth engine plant. This was achieved with the installation of a Sytronix variable speed pump drive which has subsequently achieved an energy saving of 68% on the machine for which it was installed.

To reduce energy consumption, Sytronix, which monitors the hydraulic pressure and adjusts the motor running speed so only the required pressure at any given time is delivered, was installed at the plant’s block machining line. This was the first of its kind for the OEM and for the Hytec Group.

Sytronix, a Bosch Rexroth product, is a smart interplay of hydraulics and electronics to generate hydraulic power on demand. It maintains the ideal motor speed without using more motor power than is absolutely necessary, leading to energy efficiency and cost-cutting.

Additionally, Sytronix reduces the noise levels from 72 dB(a) to 62 dB(a), almost half of that experienced on conventional power units. As the unit is a combination of a hydraulic component and a drive and control component, both Hytec’s and Tectra Automation’s specialties were required for installation and commissioning.

“Now that the absolute effectiveness of Sytronix as an energy-saving drive has been established in South Africa, we are pleased to be able to boast our prowess in assisting our customers to reduce energy usage,” concludes technical sales representative, Adriaan Botes. Tectra Automation’s standard after-sales and service applies, and all componentry is warranted for one year.

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HAW now stocks 700 bar hose

Hydraulic and Automation Warehouse (HAW) now supplies 700 bar hose, mainly used on hydraulic tooling. These hoses are lightweight and have high abrasion resistant covers. A significant step up from the standard hydraulic hose imported by HAW, the company now manufactures hose assemblies with this niche hose, which has a 4:1 safety factor and burst pressure rating of 2800 bar.

The hose core is constructed from thermoplastic elastomer and has a polyurethane covering, consisting of one or more braids of aramid fibre and one braid of steel wire. The hose can be used in environments ranging from -40 to 100°C, although 70°C should not be exceeded when transferring air and water based fluids.

The hose is ideal for very high pressure lines in compact hydraulic systems operating at 300 to 700 bar. Commonly used with rescue and safety equipment, the low change in length means that the hose can be used to transfer petroleum, synthetic or water based fluids in hydraulic systems. Available in both 6,4 and 9,5 mm diameter sizes, the hose comes in a range of colour options. HAW also boasts its own test facilities, meaning that all hose assemblies can be subjected to static hold pressure tests upon request.

HAW prides itself on a large stockholding of this hose range, which is accompanied by hose fittings and protective springs for this hose. All fittings stocked are 0,63 and 0,95 cm NPT male, and HAW also stocks 700 bar quick release couplings that work hand-in-hand with the hose assemblies.

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HYDRAULICS

New to the Sun Hydraulics cartridge portfolio and FLeX Series family are four new 350 bar solenoid operated relief valves. With a 2-stage, field adjustable design, they offer precise and dependable pressure regulation with up to 100 l/min flow rates. These RVC valves are the only family of valves on the market that offer fully adjustable, ventable and blockable relief functions. They are ideal for fixed-displacement pump applications.

The RVC valves are designed to reduce the complexity and improve the reliability and safety of flow systems. They are 2-stage, balanced piston reliefs. In relief mode, the valves open to tank (port 2), throttling flow to regulate the pressure when the pressure at the inlet (port 1) reaches the valve setting, which is adjustable. Energising the solenoid activates or deactivates the relief function.

Designed and tested to 10 million operational cycles at full rated pressure, these reliable new relief valves come in four options:

- **RVCK**: Normally vented, energise to relief.
- **RVCL**: Normally in relief, energise to vent.
- **RVMC**: Normally in relief, energise to block.
- **RVCN**: Normally blocked, energise to relief.

Reducing complexity: The valves combine the functionality of two valves into one body and one cavity, reducing materials and creating a more compact and efficient system.

Improving reliability: The main stage orifice is protected by a 150 micron stainless steel screen for extended product life.

Improving safety: The adjustment screw is leak free and contains a mechanical stop to prevent the screw from backing out, offering safe, reliable field adjustment.

**Designed with applications in mind**

Across the board, the unique design of the RVC family can reduce complexity in mobile and industrial hydraulic systems. The 2-stage design combines two cartridges in one, reducing complexity and overall cost.

The valves are also ideal in fixed displacement pump applications. Each model in the RVC valve family presents a distinct advantage to specific hydraulic systems and applications:

- **RVCK**: Use for pump start-up to unload until pressure is built, eliminating stress on the system, then energise during operation.
- **RVCL**: Allows the user to energise at start-up and de-energise during operations to keep power consumption lower during use.
- **RVMC**: Ideal in circuits that require two pressure settings, one with a high setting at acceleration, and one with a setting that is constant. The blockable RVMC regulates pressure throughout.
- **RVCN**: Use the relief function to preload the cylinder and avoid decompression shock in systems built for high capacities.

**The FLeX advantage**

These solenoid-operated relief valves add to Sun’s existing FLeX Series of directional control valves and proportional flow control valves.

Like Sun’s other FLeX products, these new relief valves offer the same quality, durability and cost-competitiveness. Typical features of the FLeX range are:

- **High reliability**: They are designed and tested to 10 million operational cycles at full rated pressure.
- **Zinc-nickel plating standard**: This gives up to 1000 hour salt fog protection.
- **Interchangeable coil options**: FLeX valves have the 740 Series high power and 747 Series hazardous location coils in a range of coil terminations and voltage options.
- **High performance**: They are available in 60 l/min and 100 l/min nominal flow rates.

As Sun continues to grow its FLeX Series, the same goal remains – to provide high performance solutions at cost-effective prices.

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CamoZZi.
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All you need for automation
Hytec commissions hydraulic systems at Black Rock Mine

Hytec recently commissioned the R10 million hydraulic systems it supplied for the new bulk handling equipment installed at Assmang’s Black Rock Mine Operations in the Northern Cape. This bulk handling system includes two stackers, a bucket wheel reclaimer and a rapid load-out station – each automated using Hytec’s proportionally controlled hydraulic systems assembled from Bosch Rexroth technologies.

“The proportional control achieved by the system delivers precise remote flexibility in adjusting, varying and optimising the load handling characteristics of the machinery to accommodate any changes in the nature of the material,” explains system sales manager, Klaus Marggraff.

The two stackers were equipped with 7.5 kW hydraulic systems that will control the stacking of manganese ore in the stockyard in various grades of material. The bucket wheel reclaimer was supplied with a 45 kW hydraulic system and includes dual luffing cylinders. At the load-out station, Hytec’s hydraulic systems extend from the control of the exit gates of the loading bin, across the weigh flask that divides the load into batches that are then transferred into the wagons below. Up to 600 l/min of hydraulic flow is required at specific stages of the load-out station, which also needs to deliver precise distribution control within each wagon with strict tolerances. “Each component used on the system, from valves, cylinders and the filtration systems filtering the oil down to six microns to the control, is from the Bosch Rexroth range of drive and control products,” Marggraff concludes.

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Hydraulic and Automation Warehouse (HAW) has expanded its hose crimper offering with the addition of the Uniflex UG32 grease crimper to its range. The UG32 launch was preceded by the arrival of UG20 grease crimper. Both of these are manufactured specifically for the southern African market by Uniflex-Hydraulik in Germany.

The UG20 grease crimper, which weighs 160 kg, is designed to crimp four-wire hoses from 6.35 to 32 mm and the 200 kg UG32 is tailored to crimp from 6.35 to 51 mm four-wire hoses. Each crimper comes standard with a quick-die-change tool, facilitating easier changes of the crimers’ die sets. This is a significant contributor to mass hose production.

Johannesburg branch manager, Neville Alberts says that being a German-manufactured product, the associated quality and reliability are a given, and both units are more cost-effective than those offered by competitors. “Another advantage of this unique range,” he points out, “is the fact that our quick-die-change tool is included in the unit price. There is already large demand for these crimers. Now, with the Group’s drive into Africa, we feel that this demand will increase substantially.”

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HYDRAULICS
Metal Work’s new EB80 is an electro-pneumatic system consisting of a solenoid valve assembly with fieldbus or multi-pin control, and modules to manage analog or digital input/output signals. It can accommodate solenoid valves with varying functions (2/2 NC, 3/2 NC and NO, 5/2 monostable and bistable, 5/3), with electric and manual controls, inlet connections with fittings up to 12 mm and output connections from 4 to 8 mm, with 10 mm to be introduced recently. Flow rate reaches 800 Nl/min in the 8 mm pipe version and 1200 Nl/min for the high flow version, which supports pipes of 10 mm.

Maintenance and diagnostics

The EB 80 was designed to be powered electrically with a large voltage range from 10,8 to 31,2 V DC in order to prevent surge or low voltage issues that can affect system behaviour. Powerful diagnostic functions for troubleshooting and replacing damaged parts are also included.

All multi-pin or fieldbus-controlled versions have an error LED for the electrical connection modules in addition to warning LEDs for each individual valve. The LED system shows solenoid valve status when there is a short circuit or a valve is missing or malfunctioning. It also shows surges, insufficient voltage and interruptions to electrical signal transmission. The presence of a fault is transmitted to the island control system, and in the case of a fieldbus connection the type of fault is also shown.

The user interface is particularly convenient. All information to be viewed and elements to be worked on are on one side of the island. Faulty parts can be replaced without dismantling the island, as can fieldbus and input/output modules.

Smart components

The diagnostic functions of the EB 80 and its ability to store large amounts of data and interface with various fieldbuses make it ideal for use in Industry 4.0 environments. Some typical applications that can be achieved with EB 80 functionality are outlined below.

The first application is the collection of self-diagnostic data, i.e. the behaviour of solenoid pilots fitted to the valves themselves. The EB 80 processor collects data, stores it in the internal memory, and sends it to the external controller via the fieldbus. It can then be processed in the field or sent to suitable storage systems in the company or a cloud server. This function enables systems to be monitored locally or from a company maintenance centre in another physical location, or even remotely by Metal Work. The second smart function is the control of cylinder response times. A typical use of island valves is to operate pneumatic cylinders, which normally have limit sensors that read the position of the piston. The digital signals sent from the sensors are read by the EB 80 input modules, completing a control ring on the cylinder itself. The island controls the movement of the cylinder and reads the signal linked to the movement itself. This is done locally without going via the PLC. As a result, the island can assess potential delays in cylinder operation, due for example to faults, pipe interruptions, seized parts or anything else. In the event of changes, an error message is generated, which can be managed locally or remotely.

The third application is the control of cylinder speed. The EB 80 can control the motion of the cylinder in both directions, and read the signals generated by the two limit switches. By doing so it can detect and monitor the average speed of the cylinder and the number of strokes completed. The island can therefore log the distance travelled and monitor speed variations, which could be due to adjustments, an increase in friction, or changes to loads applied. An unexpected reduction in speed can cause a fall in productivity, whereas a sudden increase can break the actuators or mechanical machine parts.

A standard value can be inserted for the speed and a range of tolerance. In the event of unexpected changes an error message is generated, which can be managed by the user. Verification is local, in real time and directly in the field, without the need for developing additional applications on the control system. This makes the EB 80 a very powerful and flexible smart component with no need for additional modules.

The potential applications for smart manufacturing do not end here. Use is limited only by the imagination of developers, and this is the challenge of Industry 4.0.

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Reduce compressed air costs

The cost of compressed air equipment is ever increasing and the need to economise on equipment and power consumption is critical. SUTO-iTECH Germany offers a very broad range of compressed air monitoring equipment that can monitor and display a compressed air system’s performance.

The monitoring systems include a wide variety of monitoring devices that can track:
- Airflow and vacuum flow of the compressed air or gas.
- Air velocity in pipes.
- Air pressure or vacuum pressure.
- Air temperature.
- Dew point of the condensed air.
- Particle count.
- Oil carryover within the condensed air.
- Power monitoring, kWs, volts, amps.

The information from multiple instruments can be taken back to a wall-mounted static or mobile touch-sensitive display and data logger and on to a central scada system via 4-20 mA, RS-485 or Ethernet connections. Cloud-based data capture and storage solutions are also offered through SUTO-iTEC CSM-2G systems.

The ability to monitor the compressed air system and prevent contamination before it contaminates the system is a major benefit to any services manager. When water contamination gets into a compressed air system it takes weeks to clear or evaporate, even when the dew point is rectified. The cost of monitoring is easily recouped by an instrumentation airline that remains dry and clean, ensuring equipment service and availability.

It is estimated that 25% of an average manufacturing plant’s power is spent on compressed air, with at least 20% of this cost leaking to atmosphere. Using either actual flowmeter results or using SUTO iTech software, the cost of air leaks can be reduced substantially.

Artic Driers offers a wide range of ultrasonic leak detection equipment for end-user use, and can hire out technicians by the day to evaluate a system’s air losses and cost to company. This can include taking a flow reading along with ultrasonic testing to ensure that all leaks are located. These services have been honed to perfection over the last decade. Artic can provide cost per air leak along with actual air flow per leak. This is presented on an Excel spreadsheet allowing the sorting of leak locations into order of priority.

Fixed or static air flowmeters also allow for accurate selection of new compressed air ancillaries on existing plants, allowing engineers to make informed decisions on what equipment to purchase.

Dew point monitoring can be a simple standalone unit that monitors the system’s water content, or it can be part of a bigger more comprehensive instrument set.

A dew point probe will give a pre-alert for a wide range of faults – bypass valves left open, a blocked dryer drain, a dryer that has tripped, a dryer that has a faulty freon compressor, or even a fractured heat exchanger. With dew point monitors as inexpensive as R13 000, you really cannot afford to be without these essential tools.

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There is no doubting the growing popularity of air motors, a trend driven by a myriad of advantages over their electric counterparts that include far smaller installation dimensions and their ability to be loaded until they stall, without damage. Air motors can also be used in harsh environments that are subject to effects such as dust (most are ATEX-certified), vibration and impact, while a choice of materials means that they can also function in damp and aggressive operating conditions.

Air motors can be stopped and started continually without damage, and are reversible as standard. However, it is arguably the simple design principle that appeals most to design engineers and specifiers, a factor that makes them very easy to service, while the low number of moving parts enhances reliability. To maximise the gains made available by leveraging these benefits, selecting the correct air motor for the application is paramount.

Construction and basic principles
To prepare for making the optimum selection, it is first advisable to consider the basic construction of an air motor. There are a number of different air motor designs, including tooth gear and turbine types, but this article will focus on vane types as they are more suitable for regular operating cycles, where slower speeds are required.

The principle centres on a rotor with a number of vanes enclosed in a stator and in the cylinder body. Compressed air is supplied through one connection and air escapes from the other. For reliable starting, springs press the vanes against the rotor cylinder and the air pressure always bears at right angles against the surfaces. This function means that the motor torque generated is a result of the vane surfaces and air pressure.

Air motor performance is dependent on the inlet pressure. At a constant inlet pressure, air motors exhibit the characteristic linear output torque/speed relationship. However, by simply regulating the air supply, using the techniques of throttling or pressure regulation, the output, torque and speed of an air motor can easily be modified.

A pneumatic motor achieves its maximum power when it is operating as close as possible to its rated nominal speed (50% of the rated idle speed). Energy balance and efficiency are best in this area because the compressed air is used efficiently and the power is at its maximum.

Across modern industry, oil and oil mist are avoided wherever possible to ensure a clean work environment. Manufacturers now try to avoid using components that have to be lubricated. The P1V air motors series from Parker, for example, are equipped with vanes for intermittent lubrication-free operation for power lower than 1000 W, which is the most common application of air motors.

If unlubricated compressed air is used, it should comply with the relevant purity standards in order to guarantee the longest possible
overall service life. Furthermore, if the un lubricated compressed air has a high water content, condensation can form inside the motor, causing corrosion of internal components. A ball bearing can be destroyed in a remarkably short time if it comes into contact with a single water droplet.

For food grade and other hygienic/high cleanliness applications, external components should be made from stainless steel. Take the Parker P1V-S range, for example. Here, the air motor and planetary reduction gear are built into a polished stainless steel housing. The output shaft, which is also made of polished stainless steel, is sealed by a fluorocarbon (FKM) rubber seal. This design means the motors can also be deployed under water to a depth of around 8 metres.

Thanks to a cylindrical shape, there are no pockets that can accumulate dirt or bacteria. Additionally, the two halves of the motor body are sealed with a positive O-ring to prevent contamination. Operation is intended at intermittent intervals under non-lubrication conditions. For this reason, no particles of lubricant escape with the exhaust air and service costs are reduced.

Selection criteria

First and foremost, decide which drive principle is suitable for the application. Air vane motors are ideal for regular operating cycles, where speeds are slow, say, less than 10 000 rpm, for example. In contrast, tooth gear air motors or turbines are suitable for continuous 24 hour operation, where speeds can be up to 140 000 rpm.

Environment choice is another major factor. To determine the optimum material, consider whether the air motor will operate in a normal production area, or one that is potentially explosive? Clearly, air motors have an advantage here, as electric motors typically cannot be used in ATEX-rated environments. The type of industry may also have a bearing on material selection; sectors such as paper, food processing, medical and pharmaceutical will all have an influence.

So, what about calculating the required power of the air motor? Many factors will come into play here, including direction of rotation, air pressure working range, air class quality and mainly the expected torque and speed under load.

Basic power can be calculated using a simple formula: \( P = \frac{M \times n}{9550} \). Here, \( P \) is power output in kW, \( M \) is nominal torque in Nm, and \( n \) is nominal speed in rpm. As a tip, always select a motor that is slightly too fast and powerful, then regulate its speed and torque with a pressure regulator and/or throttle to achieve the optimum working point. As a point of note, it is important to ensure that the pressure supplied to the inlet port of the motor is correct, so it can work at maximum capacity. If the valve supplying a large motor is too small or the supply line is underspecified, the pressure at the inlet port may be so low that the motor is unable to function.

Further factors determining the selection of an air motor include the position in which it will be used. Also, will standard or spring-loaded vanes be required? Spring-loaded vanes are selected to ensure they remain pressed against the cylinder when the motor stops and when working at low speeds. The spring-loaded vane option also prevents the vanes from sliding down in their track if vibration is introduced. Spring-loaded vanes therefore provide a higher starting torque, improved starting and low speed characteristics, because leakage over the vanes is reduced to a minimum.

Will an integrated brake be required? Integral spring-loaded disk brakes are typically released at a minimum air pressure of 5 bar. The brake is applied in the absence of pressure. As soon as the control port for the brake is placed under pressure, the piston is pressurised and the spring is compressed. The motor can now start and the torque is passed to the shaft.

Ventilation air from the brake is connected to the atmosphere.

In order to brake the motor, the control air to the brake is simply vented: the piston is pushed to the right by the spring, and the axle is jammed between the two brake disks. Brake motors must only ever be supplied with un lubricated air; otherwise, there is a risk of oil from the supply air getting into the brake unit, resulting in poor brake performance or no braking effect whatsoever.

Will a high torque air motor be required? These drive solutions are particularly suitable for use in industrial agitators and mixers, as used in the paint, food and pharmaceutical industries. Such motors are also suitable for pneumatic drilling and grinding tools.

Conclusion

For intermittent, yet regular operating cycles where speeds are low, vane-type air motors provide a great option. However, only by optimising the selection and installation process, users will be able to enjoy the potential benefits and maximise efficiency and longevity.

For more information contact Lisa de Beer, Parker Hannifin SA, +27 11 961 0700, lisa.debeer@parker.com, www.parker.com/za
Gearbox lubricant helps combat water ingress

Food and beverage, pharmaceutical and other clean environments require NSF H1-grade lubricants for hygiene, health and safety purposes. Rocol Rapid Demulce 220 from leading supplier Bearings International (BI) is ideal for such demanding applications. This is a non-toxic, high performance gearbox lubricant designed especially for applications where water ingress is an issue. It splits rapidly from the water, which can then be drained from the gearbox periodically, allowing the oil to continue lubricating. Hence service life between oil changes is extended rapidly. Conventional oils tend to emulsify into a creamy, frothy mix that does not lubricate effectively.

Rocol Rapid Demulce allows for rapid water demulsification under conditions of high load and elevated temperature. It also allows for quick water drainage to reduce downtime, and has good wear protection properties to boot. It can be used in a wide temperature range from –5 to 130°C, and is NSF H1 registered for use where incidental contact with foodstuffs may occur, as well as ISO 21469 certified.

Rocol key accounts manager, Richard Daley says that Rapid Demulce 220 will continue gaining traction in the South African market. In one of the first large-scale applications of the product locally, it has been slashing downtime on a client’s gearboxes since July 2017. “The challenge of water ingress into gearboxes is a problem that many plants and industries have to contend with. Increasingly stringent requirements are focusing on food-safe lubricants with regard to cross-contamination and we are able to provide an ideal solution for the food and beverage industry,” concludes Daley.

Hygienic bearings are key to food safety

An emphasis on the hygiene element of the design of equipment can play an important role in controlling the safety of manufactured food products. However, applying this too broadly without focusing specifically on the hygienic design of the components part of the system can potentially result in the spread of bacteria trapped within bearings.

Hygienic design considers specifically how problems such as corrosion, lubricant leakage, cleaning and self-drying could adversely affect food safety and applies design principles to solve the problem. In essence, it is a design philosophy applied through dedicated and specific rules. Just as ergonomic design pays close attention to the physical needs of product users, hygienic design focuses on preventing issues of food contamination.

In general, European Hygienic Engineering & Design Group (EHEDG) guidelines consider bearings an easy place to trap food particles and water and therefore these are seen as potential breeding grounds for bacteria. The advice is: keep bearings well away from food product contact areas.

This is very much the case with recent guidelines on hygienic design of belt conveyors for the food industry, where EHEDG addresses two of the major challenges in safe food production: how to avoid contamination of food through inadequately designed processing equipment and how to improve food safety without raising operating costs for cleaning and production hygiene. Even if significant attention is paid to systems design and major components such as belts, bearing units consistently have a low profile within overall hygienic system design.

Even if not in direct contact with the food zone, bearings are often in the proximity of food products and with high pressure water or dry cleaning regimes there is a risk that bacteria – if present – can become airborne and potentially contaminate the food product. In order to minimise this risk of contamination, the design of bearings with hygienic design principles is a key consideration. One of the most important principles underpinning hygienic design is the ability to clean effectively. This is often difficult to achieve in practice for bearings and bearing units. For a start, the products should be made from non-corrosive and non-porous materials, such as stainless steel, or composites and with shapes that are cleanable, allowing self-draining. Bearing units should have filled bases, which avoids cavities where bacteria may collect. In general, materials used such as elastomers and composite and grease should be compliant with food safety directives and regulations. In all instances grease leakage onto the food product during operation should be avoided. Ideally, bearing unit’s should have effective end covers that prevent process contaminants and cleaning fluids from entering the bearing unit’s cavity, and at the same time allow frequent visual inspection.

Other relevant considerations are:
• Avoid metal to metal contacts in between unit components and in between units and attaching surfaces.
• Avoid relubrication as much as possible.
• Aim for a high service life despite demanding operating and cleaning regimes.

Hygienic design applies to food production and packaging machinery as a whole entity; but dealing specifically with one of the most problematic components – bearings – can help to improve the overall risk profile.

For more information contact Bearings International, +27 11 899 0000, info@bearings.co.za, www.bearings.co.za

For more information contact Samantha Joubert, SKF South Africa, +27 11 821 3500, samantha.joubert@skf.com, www.skf.co.za
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**BEARINGS, SEALS, BELTS & CHAINS**

**Tsubaki chain wear indicators**

BMG has extended its range of Tsubaki chain wear indicators, with the addition of the recently launched large size gauges. Business unit manager, Carlo Beukes says: “We recommend that chain wear indicators are used as part of the regular maintenance schedule of a machine or production line. By regularly checking and replacing chains before they reach 1.5% elongation, shock loads are prevented and sprocket wear is significantly hindered.”

These large size indicators are available in sizes RS-20B to RS-48B and ANSI large size indicators cover sizes from RS-100 to RS-240. These complement the existing BS sets, which are used with sizes RF-06B to RS-16B and ANSI sets for sizes RS-35 to RS-80. The corrosion-resistant gauges, manufactured to stringent quality specifications, have one end shaped to mount over a roller, while the tip of the other end indicates the degree of wear by highlighting the total elongation over a number of links.

Correct chain care involves monitoring chain wear, which can cause a loss of tension, and thus reduced transmission efficiency. Chain wear also affects the alignment accuracy of the drive, which increases noise and vibration levels. If wear is allowed to increase to a critical point, the chain will begin riding and jumping on the sprockets, which causes shock loads, which in turn further accelerates wear. These problems are avoided with the regular use of BMG’s Tsubaki chain wear indicators, which play an important role in maintenance programmes, to ensure optimum efficiency of the overall drive system.

*For more information contact Lauren Holloway, BMG, +27 11 620 7597, laurenhy@bmgworld.net, www.bmgworld.net*

**Elastic multi V-belt for modern engines**

ContiTech has introduced a new elastic multi-V-Belt to the southern African automotive market that enables non-positive power transmission of torque in belt drives without a tensioning pulley. Instead, the belt is engineered with integrated tension members, which enables it to maintain tension throughout its lifetime. Designed to meet the demanding requirements of modern engines, the new V-belts can be used to drive a wide range of automotive systems, including alternators, fans, water pumps, air-conditioning compressors and power steering.

The multi V-Belt is made up of three main components: a cover coat, the tension member and rib coating. The cover coat features a textured reverse consisting of synthetic rubber with a high wear resistance. Specialised coating is also employed on the ribs, which guarantees good noise properties and an ideal grip, even on a slightly misaligned drive.

These belts are directly subject to constant movement and environmental stresses such as dust, dirt and high and extreme temperature ranges, and ContiTech recommends changing these belts after 120 000 km. During service and repair work on a vehicle with a factory-fitted elastic belt, this component must be replaced with another elastic belt. Normal multi V-belts do not work in these vehicles because of their different construction. Also, it is important to use the correct tools when working with any V-belt, and ContiTech offers a complete range of special tools and belt sets.

*For more information contact Paul van Zyl, ContiTech South Africa, +27 11 248 9337, paul.vanzyl@contitech.co.za, www.contitech.co.za*
Conveyor belt skirting system

New to the range of bulk handling systems from BLT World is the contact-free AirScrape conveyor belt skirting system, which significantly reduces material spill, dust formation and explosion hazards at transfer points and other critical sections in the conveyor chain. Because this system hovers freely above the conveyor belt, skirt friction and belt damage is eliminated and service life is extended.

“The AirScrape system operates according to a new principle where it hovers at 1 to 2 mm on the left and right side above the conveyor belt. These blades deflect larger particles inwards, while using the air flow of the conveyor belt and conveyed material to create an inward suction, flowing any dust and fine particles back into the product flow,” explains managing director, Ken Mouritzen. “Through these diagonally fitted plates and the speed of the running belt, air is drawn from the outside inwards. As a result, neither the dust nor material can escape.”

With the AirScrape dust-free and contact-free side sealing system for belt conveyors, there is no skirt contact and therefore no belt wear or damage. Motor power requirements are reduced as there is no belt-skirt friction and because there is continuous skirting with no gaps, product loss is minimal. This system, designed and manufactured in Germany to the highest quality standards by ScrapeTec, is available throughout Africa and the Indian Ocean islands.

For more information contact Ken Mouritzen, BLT World, +27 31 274 8270, ken@bltworld.com, www.bltworld.com

Power logging meter kit

The Enerteq from Mimic Components is a cost effective power logging meter used for power analysis. Supplied in a kit form, it is ideally suited for solar, energy and electrical industries. The power meter measures currents and voltages and reports in real-time RMS values for all 3-phases and neutral. In addition, the power meter calculates power factor, real power and reactive power in addition to other characteristics.

The power logger is a practical handheld portable meter with a dielectric withstand double insulated front panel display, a 9 cm quality colour TFT LCD graphic screen display and menu and navigation buttons. The instrument and its accessories have a CAT IV safety rating up to 600 volts.

The TFT LCD graphic screen display allows viewing of all minimum/maximum values since the last reset, the reset date and time, including reset minimum/maximum values. Energy values can also be viewed from the display in so far as the power meter calculates and stores per phase and total energy values for active, reactive and apparent energy. It also includes current and voltage inputs, power and an SD card.

The Enerteq kit is a complete solution for anyone involved in alternative energy or other power requirements that need network analysis. The kit contains four voltage clamp wires with banana plugs, one power adaptor (85-265 V AC to 9 V DC), one 1 GB SD card, three Rogowski coils, one power meter and one USB-to-SD adaptor in a robust lockable case with attached shoulder strap.

For more information contact Christo Vosloo, Mimic Components, +27 11 689 5700, christo@mimic.co.za, www.mimic.co.za

Advanced new range of vertical turbine pumps

Strong demand for high efficiency vertical pumps has prompted global pump manufacturer, KSB to manufacture a comprehensive range of advanced vertical turbine pumps for a wide range of applications.

The new B-Pumps are multistage vertical turbine pumps with a submerged hydraulic system comprising strong and efficient discharge casing assemblies, column pipes and pump bowls in the assembly. Depending on the size and application required, the new range is available in 17 sizes with three different impeller types.

According to regional sales manager David Jones, the pump sets cover heads of up to 200 metres and flow rates of up to 720 litres per second with anything from one to 25 stages. Stage casing diameters range from 15.24 cm to 61 cm, with various designs allowing above-floor or underfloor discharge.

B-Pumps can be driven by vertically mounted electric motors or via a right angle gear with a horizontal diesel engine or electric motor. The maximum permissible speed is 3500 rpm.

A wide range of materials can be specified, including standard grey cast iron and steel derivatives or special material including stainless steel, duplex and super duplex stainless steel or customised materials. Internally the pumps have intermediate pump shaft bearings which are lubricated by the fluid handled, or may be fitted with an external lubrication supply. Externally, the casing is designed for a pressure of 16 bar; the discharge flange dimensions are compliant with DIN, BS and ASME standards.

For more information contact Annett Kriel, KSB Pumps and Valves, +27 11 876 5600, annett.kriel@ksb.com, www.ksbpumps.co.za

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For more information contact Christo Vosloo, Mimic Components, +27 11 689 5700, christo@mimic.co.za, www.mimic.co.za
New packaging design for SKF CR seals

SKF has introduced a new packaging design for its vehicle aftermarket products.

Inspired by the 140th anniversary in 2018 of the founding of Chicago Rawhide (CR), SKF decided to relaunch the CR Seals brand as a pure product brand within the SKF portfolio. Founded in 1878, Chicago Rawhide became a well-known supplier of seals to a variety of industry segments, including automotive, industrial, truck and marine markets. CR was acquired by SKF in 1990 and the brand was eventually retired in 2007. Since then, CR has maintained high brand recognition in the market where many channel partners still use the CR name. The SKF packaging design stays true to the company’s traditional blue colour for bearings and green colour for seals, and incorporates graphic elements that pay tribute to the long company history and SKF’s areas of expertise. The focal point of SKF’s new design is a zoomed-in graphic of its iconic wheel bearing.

“The success of SKF vehicle aftermarket products is rooted in aspects that remain universally important – a commitment to quality, longstanding technological expertise and a true sense of customer service,” said technology development manager, Andre Weyers. “With the continued high brand recognition of Chicago Rawhide, bringing back the brand to recognise the heritage was a natural progression. Our new design highlights these values in a modern and dynamic way and reinforces SKF’s position as the leading brand for aftermarket products within our category.”

For more information contact Samantha Joubert, SKF South Africa, +27 11 821 3500, samantha.joubert@skf.com, www.skf.com

Custom-made processing belts for the food industry

Spiraflex open mesh conveyor belts are manufactured and packaged in Italy. They are specifically designed for the processing and transport of products in demanding manufacturing sectors such as food, hygiene products, insulation, nonwovens, wood processing, biomass fuel and synthetic sheet materials. All of these use Megadyne’s open mesh belts, for at least one of the following processes: washing de-watering, heating, cooling, pressing and forming.

SACIF, a recent acquisition of the Megadyne Group, is a leader in fabricating conveyor, open mesh and special timing belts. The width and depth of this special products range is strengthened with the introduction of Spiraflex conveyor belts, made with food contact approved materials and in full compliance with the hygiene rules that regulate food processing and manufacture.

Spiraflex conveyor belts are safe and reliable, reducing any risk of product contamination due to Megadyne’s specialised fabrication techniques. They are lighter and have higher performance compared to conveyor belts with a metal mesh. The temperature range is from -30 to 90°C.

Manufactured in white PET, they are resistant to high temperatures, non-stick and fully antistatic. The belt edges are sealed to ensure that belt integrity is maintained during operation and through aggressive cleaning regimes. Spiraflex is available in rolls with a production width of 2000 mm and a minimum pulley diameter of 25 mm.

For more information contact Patrizio Trevisan, Megadyne South Africa, +27 12 661 1652, patrizio.trevisan@megadynegroup.com, www.megadynegroup.com

Double V-girder quadruples lifting capacity

Konecranes and Demag has developed a new Double V-Girder crane which is capable of a 50 ton lifting capacity – four times that of the Single Girder. These double-girder overhead travelling cranes offer exceptional load capacity for a low deadweight. Their outstanding crane geometry also provide for extremely good travel characteristics, which minimises wear on the end carriages and crane runway. The load hook can be raised between the two crane girders, which allows large lifting heights to be achieved.

It also offers high long and cross-travel speeds thanks to a high performance double-girder design. The girders can be adapted to building structure requirements and have minimum approach dimensions thanks to the compact travelling hoist design.

Their innovative design featuring tapered diaphragm joints reduces oscillation frequency by 30%, cuts weight by an average of 17% and doubles the service life to as many as 500 000 changes of load. This has significantly improved efficiency for handling loads and higher handling rates than conventional box-section girders. Sensitive loads can also be positioned more precisely and carefully, which speeds up the process. From a safety point of view, the surface area exposed to wind is reduced by up to 55%. It also offers a much improved view for the operator.

The eco-friendly utilisation of resources is reflected by the use of less material, reduced drive output requirements, blast cleaning of metal parts with dry ice and the use of water-based paints. The possibility of energy recovery completes the concept.

For more information contact Konecranes and Demag, +27 11 898 3500, infoza@konecranes.co.za, www.konecranes.co.za
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